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AR242

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Andy Lincoff
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75 Hawthorne Street
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Ref: Review of Feasibility Study Report United Heckathorn Site, Richmond, California.

Dear Mr. Lincoff:

The U.S. Department of Commerce/National Oceanic and Atmospheric Administration (NOAA) appreciates the opportunity to review and comment on the "Feasibility Study Report United Heckathorn Site, Richmond, California" (dated 11 January 1991) as prepared by Levine-Fricke.

The Feasibility Study (FS) addresses remedial action objectives (RAOs) and alternative clean-up actions for soils, sediments, surface water, groundwater, and air at the United Heckathorn site. DDT (total) was considered the contaminant of concern. A target clean-up level of 1,000 µg/kg total DDT was proposed for remediation of upland soils and the embankment sediments. Sediments with concentrations greater than 200 µg/kg total DDT were proposed to be remediated in Lauritzen Canal.

A number of remedial actions have been proposed for the site including "no action," use restrictions (*e.g.*, limited site access), removal (*e.g.*, dredging) and disposal (*e.g.*, on-site or off site), containment (*e.g.*, capping or horizontal barriers), and treatment (*e.g.*, chemical stabilization). Post-remediation environmental monitoring was proposed for most alternatives. Several remedial actions emerged as the preferred alternatives by the PRP. Specifically, containment of sediments behind a steel sheet pile wall along the east bank of the canal and behind a sheet pile and rock dam at the head of the canal was proposed to remediate the intertidal embankment and subtidal sediments in Lauritzen Canal. Capping was the preferred action for the upland site.

In general, the environmental evaluation component is inadequate in both depth and scope. The proposed characterization of the marine habitat which has been contaminated is not comprehensive, and the derivation of target clean-up level of 200 µg/kg for total DDT in marine sediments was flawed both technically and conceptually. Specific comments follow.

The remedial action objective of 200 µg/kg DDT was proposed for clean-up of Lauritzen Canal sediments based on a calculated "background level" for DDT in San Francisco Bay. The data used to derive the "background concentration" were from a NOAA's Status and Trends Technical Memorandum, "Status and Trends in Concentrations of Contaminants and Measures of Biological Stress in San Francisco Bay", of which I am a co-author. Levine-Fricke used an arithmetic mean DDT value for peripheral areas of San Francisco

Bay, excluding Lauritzen Canal, as reported in our Tech Memo. This value (actually 190 µg/kg dry weight) was taken by Levine-Fricke to represent the bay-wide, general "background" level of contamination by DDT.

It is important to note that the approach used to calculate the arithmetic mean value presented in our tables $[(x_1 + x_2 .....+x_n)/n]$ is not an accurate statistical representation of the measure of central tendency of DDT concentrations, as clearly stated in our Tech Memo. This approach assumes that the data are normally distributed and the mean is the best measure of the central tendency or where most of the data points fall. Environmental data in general and chemistry data in particular, usually violate this assumption (*i.e.*, these data have some other type of distribution). And the DDT data for San Francisco Bay are in fact obviously skewed towards a log distribution. Because the data are skewed, the best estimate of central tendency is represented by the median (if the data are ranked by concentration, the median is the concentration at which half the observations are above it and half are below it). This fact was also explicityly stated in our report, and median values were presented in the tables used by Levine-Fricke. When the median is used as a representation the "background" level of contamination in peripheral areas of the bay, a target clean-up level of 23 µg/kg would be derived.

However, another highly contaminated area (*i.e.*, the Berkeley Marina) was included in the data set we used within our report, which had the effect of raising the resulting median value. If this one other obvious DDT "hot spot" in San Francisco Bay is excluded and a new "background" level recalculated, the end result drops to 20 µg/kg DDT.

Furthermore, as was stated repeatedly in our Tech Memo, contaminants are widespread in biota and sediments throughout the San Francisco Bay system. All areas sampled within the bay thus far have been impacted to some degree by anthropogenic contaminant sources (*i.e.*, elevated above coastal reference). However, a general pattern towards elevated levels in peripheral areas of the bay *versus* the main basins was observed for numerous contaminants, including DDT. Given this fact, a more accurate indication of an overall, regional "background" level of contamination by DDT would in fact be the median for the main basin portions of the San Francisco Bay system. This value, also clearly stated in our Tech Memo, was 3 µg/kg DDT.

So far this discussion has revolved merely around the proper arithmetic representation of a "background" level of DDT in sediments. However, a purely arithmetic approach to determining target clean-up levels does not account for environmental fate and effects of DDT, and is not an acceptable approach to NOAA. Target clean-up levels must be protective of the natural resources, and as such, incorporate existing information regarding the toxicity of DDT.

If an effects-based approach to evaluate the proposed RAO for sediments in Lauritzen Canal is used, 200 µg/kg DDT is clearly unacceptable since it is higher than most values reported to have an effect, as cited in Long and Morgan (1990). Of the studies reporting adverse effects associated with DDT cited by Long and Morgan, half the effects observed or predicted occurred at total DDT concentrations above 222 µg/kg. The lower end of the spectrum for bioeffects due to DDT exposure, as represented by the 10^{th} percentile, is 3 µg/kg. Using reported toxicity data from spiked sediment *Crangon* bioassays, the LC_{50} for total DDT was reported at 20 and 30 µg/kg in Long and Morgan's report. In addition, the San Francisco AET for 4,4'-DDT is approximately 10 µg/kg. So, based on effects, an RAO an order of magnitude lower than that proposed (20 µg/kg *versus* 200 µg/kg DDT) is probably justifiable and would be much more protective of aquatic resources.

Other deficiencies were noted in the FS document. Currently, the FS addresses only remediation of soils at the main United Heckathorn site and only sediments in Lauritzen Canal. Using even the 200 µg/kg total DDT clean-up level for sediments proposed in the FS and data presented in the FS for DDT levels in Santa Fe Channel, it would be required that some areas within the Santa Fe Channel also be remediated since the proposed target level was exceeded at several sites within this channel. This fact must be made explicit. In addition, Levin Enterprises (parent company of LRTC) also owns the upland areas bordering Parr Canal which were used for disposal of contaminated sediments from Lauritzen Canal during the 1960's. This site needs to be addressed in the FS for any remedial actions proposed for the United Heckathorn site.

The extent of contamination outside of Lauritzen Canal was not well documented. Numerous existing studies have indicated that DDT concentrations are elevated in sediments in Harbor Channel and inner Richmond Harbor. This elevation may be due to sediment transport from Lauritzen Canal. For the purpose of planning and designing any remediation, the magnitude and extent of chlorinated pesticide contamination in channels hydraulically connected to Lauritzen Canal needs to be documented.

Also, a minor misrepresentation (page 24) concerning FDA limits was noted. The FS listed FDA limits as "health protective". This is not wholly accurate, as FDA admits their criteria must take into account other factors including the resultant economic implications.

To minimize any future problems with contaminants at the United Heckathorn site, it is recommended that permanent remedial actions be pursued. Given that United Heckathorn may have contributed up to 30 percent of the DDT contamination presently found in San Francisco Bay sediments, it is important to remove this site as a source. Currently, the upland area is capped with gravel to prevent wind erosion and transport of contaminated soils. It would be preferable that a permanent, impervious capping material be put in place over the upland site. This will prevent both aerial and groundwater transport of chlorinated pesticides away from the site.

The information presented in the FS was inadequate to evaluate the effectiveness of the proposed remedial actions for the intertidal and subtidal sediments. Proposed remediation of sediments includes construction of a sheet pile wall backed with geotextile material along the toe of the east bank. This wall would be backed-filled with sediments dredged from Lauritzen Canal. In addition, a combination sheet pile/rock dam backed with geotextile material would be built at the head of the canal. Contaminated sediments at the head of the canal would be left in place behind the dam. Less contaminated sediments from the canal would be dredged to fill in the area behind the dam. Use of geotextile material assumes that some water movement will occur across the barrier. This material essentially acts as a filter. In order for it to work properly, the pore size of the material must be small enough to retain sediments without plugging and large enough to allow passage of water. Sediment grain size characteristics of the dredge disposal material must be measured prior to designing any barriers.

Use of pervious materials to form a barrier along the eastern shoreline assumes that groundwater transport is not a major pathway of offsite migration. However, DDT was detected at levels 1000 times greater than marine chronic Ambient Water Quality Criteria (AWQC) (Sampson *et al.* 1990) in groundwater at the site. Unfortunately this issue is complicated by the lack of characterization of groundwater movement at the site. Capping of the upland site with impervious materials would tend to prevent potential leaching of contaminants into the groundwater by percolation of rainwater. Yet, it is likely that groundwater is influenced by tidal movement and flows from upgradient areas. If contaminated sediments extend into the groundwater layer, tidal pumping may enhance

leaching of the contaminants that might not otherwise occur. In addition, back filling the wall with dredge disposal material from the canal may exacerbate leaching by tidal pumping of groundwater. Given that mean DDT levels in sediments of Lauritzen Canal are four orders of magnitude greater than interim EP sediment guidelines, containment of contaminated sediments behind a permeable barrier would be predicted to be a chronic source for leachate above the AWQC for the protection of aquatic life. This remedial alternative would obviously be unacceptable for the protection of NOAA resources.

Any dredging of contaminated sediments is likely to have deleterious impacts during the actual dredging events due to resuspension of contaminated sediments. Selection of dredging equipment and procedures, particularly dewatering, should seek to minimize any impacts of this nature.

Last but not least, it is the intent of Superfund to find permanent solutions to contaminant problems. The PRP-preferred remedial actions for the site are not necessarily permanent solutions. On-site contaminant containment may not be the best or most environmentally protective alternative in the long run. Further loss of habitat by on-site sediment containment would require extensive justification plus a greater level of mitigation for habitat degradation.

If you have any questions about these comments or require further explanation or elaboration, I can be reached *via* 744-3126 or in my Seattle office at FTS 392-6340

Sincerely,

Michael Buchman
Acting Coastal Resources Coordinator

References

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